JOURNAL OF CELLULAR PHYSIOLOGY

BOARD OF EDITORS

ANGUS F. GRAHAM, Managing Editor
The Wistar Institute

W. R. AMBERSON
Marine Biological
Laboratories

H. F. BLUM Princeton University

D. W. BRONK The Rockefeller University

S. S. COHEN University of Pennsylvania

J. S. COLTER University of Alberta

V. DEFENDI The Wistar Institute

B. EPHRUSSI Western Reserve University

H. GREEN
New York University
School of Medicine

J. D. JUDAH Chicago Medical School R. S. KROOTH
The University of Michigan
Medical School

T. MAKINODAN
Oak Ridge National
Laboratory

L. A. MANSON The Wistar Institute

P. I. MARCUS Albert Einstein College of Medicine

D. MARSLAND Marine Biological Laboratories

D. MAZIA University of California

M. L. MENDELSOHN Hospital of the University of Pennsylvania E. A. McCulloch University of Toronto

R. P. PERRY Institute for Cancer Research

R. B. ROBERTS
Carnegie Institution
of Washington

P. SIEKEVITZ
The Rockefeller University

A. B. STAVITSKY Western Reserve University

H. M. TEMIN University of Wisconsin

L. WARREN University of Pennsylvania

L. WEISS Roswell Park Memorial Institute

VOLUME 70

AUGUST, OCTOBER, DECEMBER 1967

PUBLISHED BY

THE WISTAR INSTITUTE OF ANATOMY AND BIOLOGY
PHILADELPHIA, PA.

Copyright 1967
THE WISTAR INSTITUTE
OF ANATOMY AND BIOLOGY

Contents

No. 1 AUGUST 1967

PHILIP C. LARIS. Variation in Fructose Transport among Beef Erythrocytes	1
Leslie E. Blumenson. Dynamic Adhesion and Separation of Cells in Vitro. I. Mathematical Analysis of the Experimental System	7
LEONARD WEISS AND LESLIE E. BLUMENSON. Dynamic Adhesion and Separation of Cells in Vitro. II. Interactions of Cells with Hydrophilic and Hydrophobic Surfaces	23
BELA J. GULYAS AND JOSEPH C. DANIEL, Jr. Oxygen Consumption in	20
Diapausing Blastocysts	33
Peter C. Nowell and Leonard J. Cole. Clonal Repopulation in Reticular Tissues of X-irradiated Mice: Effect of dose and of limb-shielding	37
ALCIDES F. REGA, ASER ROTHSTEIN AND ROBERT I. WEED. Erythrocyte Membrane Sulfhydryl Groups and the Active Transport of Cations	45
T. E. James and T. J. Byers. The Induction of Multinuclearity in Agitated and in Aging Cultures of Acanthamoeba Sp. Neff	53
R. A. Tobey, E. C. Anderson and D. F. Petersen. Properties of Mitotic Cells Prepared by Mechanically Shaking Monolayer Cultures of Chinese Hamster Cells	63
S. FISCHER AND S. LITVAK. The Incorporation of Microinjected ¹⁴ C-Amino Acids into TCA Insoluble Fractions of the Giant Axon of the Squid	69
RONALD C. RUSTAD. The Stimulation of Amino Acid Incorporation into the Protein of Unfertilized Sea Urchin Eggs by Y-irradiation	75
THEODORE L. JAHN. The Mechanism of Ciliary Movement. III. Theory of Suppression of Reversal by Electrical Potential of Cilia Reversed by Barium Ions	79
WILLIAM R. AMBERSON AND ADELIA C. BAUER. Electrophoretic Studies of Muscle Proteins. I. Complex Formation Between Delta Protein	91
and F-actin	91
Francisco Bertini, John L. Mego and J. Donald McQueen. Distribution in Tissue Homogenates, and the Nature of the Linkage of Injected Proteins to Subcellular Particles	105
JOHN L. MEGO AND J. DONALD McQUEEN. Heterolysosome Formation in Mouse Liver	115
K. Bowler and C. J. Duncan. Evidence Implicating a Membrane ATPase in the Control of Passive Permeability of Excitable Cells	121
A. G. MACDONALD. Delay in the Cleavage of Tetrahymena pyriformis Exposed to High Hydrostatic Pressure	127
Comments and Communications	
DONALD METCALF, ROGER FOSTER AND MORRIS POLLARD. Colony	
Stimulating Activity of Serum from Germfree Normal and	131

No. 2 OCTOBER 1967 (PART I)

RODNEY A. OLSON, WILLIAM H. JENNINGS AND MARY BELLE ALLEN. Spectral Properties of a Pigmented Body in Hymenomonas sp.: An extra-chloroplast organelle containing chlorophyll	133
Margarida O. Krause. Tritiated Thymidine Effects on DNA, RNA, and Protein Synthetic Rates in Synchronized L-Cells	141
JOSEPH C. DANIEL, JR. AND R. SIVARAMA KRISHNAN. Amino Acid Requirements for Growth of the Rabbit Blastocyst in Vitro	155
B. G. Adams and L. W. Parks. Evidence for Dual Physiological Forms of Ergosterol in Saccharomyces cerevisiae	161
G. L. Whitson, J. G. Green, A. A. Francis and D. D. Willis. Cyclic Changes in the Alcohol-soluble Carbohydrates in Synchronized Tetrahymena. I. Fractionation	169
TOBY C. RODMAN. Control of Polytenic Replication in Dipteran Larvae. I. Increased Number of Cycles in a Mutant Strain of Drosophila melanogaster	179
TOBY C. RODMAN. Control of Polytenic Replication in Dipteran Larvae. II. Effect of Growth Temperature	187
MARTIN MACKLIN. Osmotic Regulation in Hydra: Sodium and calcium localization and source of electrical potential	191
George D. Webb. Electrophysiological Studies of the Isolated Posterior Moiety of the Electroplax of the Electric Eel	197
Douglas Marsland and Donald Meisner. Effects of D ₂ O on the Mechanism of Pigment Dispersal in the Melanocytes of Fundulus heteroclitus: A pressure-temperature analysis	209
PATRICIA O. PRUETT, ROBERT L. CONNER AND JOHN R. PRUETT. Orthophosphate Flux Across the Membrane of Tetrahymena pyriformis W	217
Comments and Communications CLARENCE L. BAUGH, ROBERT W. LECHER AND ALFRED A. TYTELL. The Effect of pH on the Propagation of the Diploid Cell WI-38 in Galactose Medium	225
No. 2 OCTOBER 1967 (PART II)	
R. F. KIMBALL. Introduction	vii
Franklin W. Stahl. Circular genetic maps	1
C. A. THOMAS, JR. The rule of the ring	13
S. Spiegelman, I. Haruna, N. R. Pace, D. R. Mills, D. H. L. Bishop, J. R. Claybrook, and R. Peterson. Studies in the replication of viral RNA	35

CONTENTS

JOHN CAIRNS AND CEDRIC I. DAVERN. The mechanics of DNA replication in bacteria	65
François Cuzin, Gérard Buttin, and François Jacob. On the mechanism of genetic transfer during conjugation of <i>Escherichia coli</i>	77
KWEN-SHENG CHIANG AND NOBORU SUEOKA. Replication of chromosomal and cytoplasmic DNA during mitosis and meiosis in the eucaryote Chlamydomonas reinhardi	89
MATTHEW MESELSON. Reciprocal recombination in prophage lambda	113
RHODA F. Grell. Pairing at the chromosomal level	119
A. H. DOERMANN AND DAVID H. PARMA. Recombination in bacteriophage T4	147
A. J. Clark. The beginning of a genetic analysis of recombination proficiency	165
JERARD HURWITZ, ANDREW BECKER, M. L. GEFTER, AND M. GOLD. Enzymatic reactions at termini of DNA	181
JUN-ICHI TOMIZAWA. Molecular mechanisms of genetic recombination in bacteriophage: Joint molecules and their conversion to recombinant	901
molecules	201
ROLLIN D. HOTCHKISS. Perspectives	215
INDEX	225
No. 3 DECEMBER 1967	
Acknowledgment	229
GEORGE MELNYKOVYCH, CAROLE F. BISHOP AND MARY ANN B. SWAYZE. Fluctuation of Alkaline Phosphatase Activity in Synchronized	231
Heteroploid Cell Cultures: Effects of Prednisolone	231
H. G. Hempling. Application of Irreversible Thermodynamics to a Functional Description of the Tumor Cell Membrane	237
Albert S. Kuperman, Michiko Okamoto and Elaine Gallin. Nucleotide Action on Spontaneous Electrical Activity of Calcium Deficient Nerve	257
JOHN E. BYFIELD AND OTTO H. SCHERBAUM. Stability of Division-related Protein and Nucleic Acid Fractions in Synchronized <i>Tetrahymena</i>	265
RICHARD G. HAM AND LOUANN W. MURRAY. Clonal Growth of Cells Taken Directly from Adult Rabbits	275

VI CONTENTS

PERTTI AULA AND WARREN W. NICHOLS. The Cytogenetic Effects of Mycoplasma in Human Leukocyte Cultures	28
Yoshisada Fujiwara. Role of RNA Synthesis in DNA Replication of Synchronized Populations of Cultured Mammalian Cells	29:
JOHN P. BADER. A Change in Growth Potential of Cells after Conversion by Rous Sarcoma Virus	301
INDEX TO VOLUME 70	309